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Abstract

Methods for electronic perturbation of fluorescence, chemilluminescence and other emissive materials provide for molecular biological analysis. In a preferred method for hybridization analysis of a sample, an electronic stringency control device is used to perform the steps of: forming a double-stranded hybridization product comprising a sample nucleic acid and a probe of known sequence, wherein the sequences of the sample nucleic acid and probe either are the same or differ by one nucleotide, an environmentally sensitive emissive fluorescent label being associated with the hybridization product in proximity to the nucleic acid to be identified, wherein either the sample nucleic acid or the probe is attached the electronic stringency device, subjecting the double-stranded hybridization product to a varying electrophoretic force, monitoring the fluorescence from the double-stranded hybridization product while varying the electrophoretic force over time, and analyzing the fluorescent signal to identify the nucleic acid of the sample.